

# EPA's Resource Conservation Challenge



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Indianapolis, Indiana



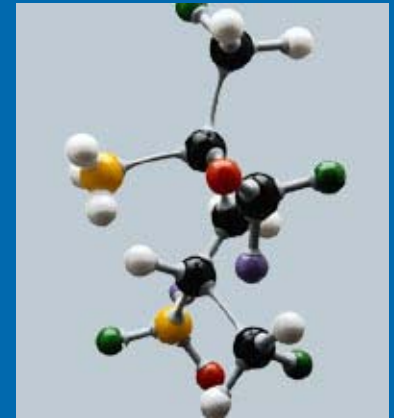
**WOOD**



**OIL**



**MINING**



**CHEMICALS**

**(+)  
PRODUCTS**



**MANUFACTURING**



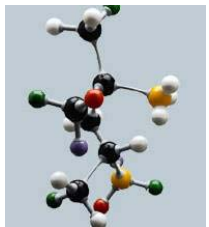
**(-)  
RELEASES**



# How We Use Materials

- Raw materials (e.g., mining, extraction)
- Processing (e.g., cleanup, synthesis)
- Manufacturing (e.g., assembly, packaging)
- Products (consumer and non-consumer\_
- Releases (land, air, water)

## Virgin Materials



## (+) Products



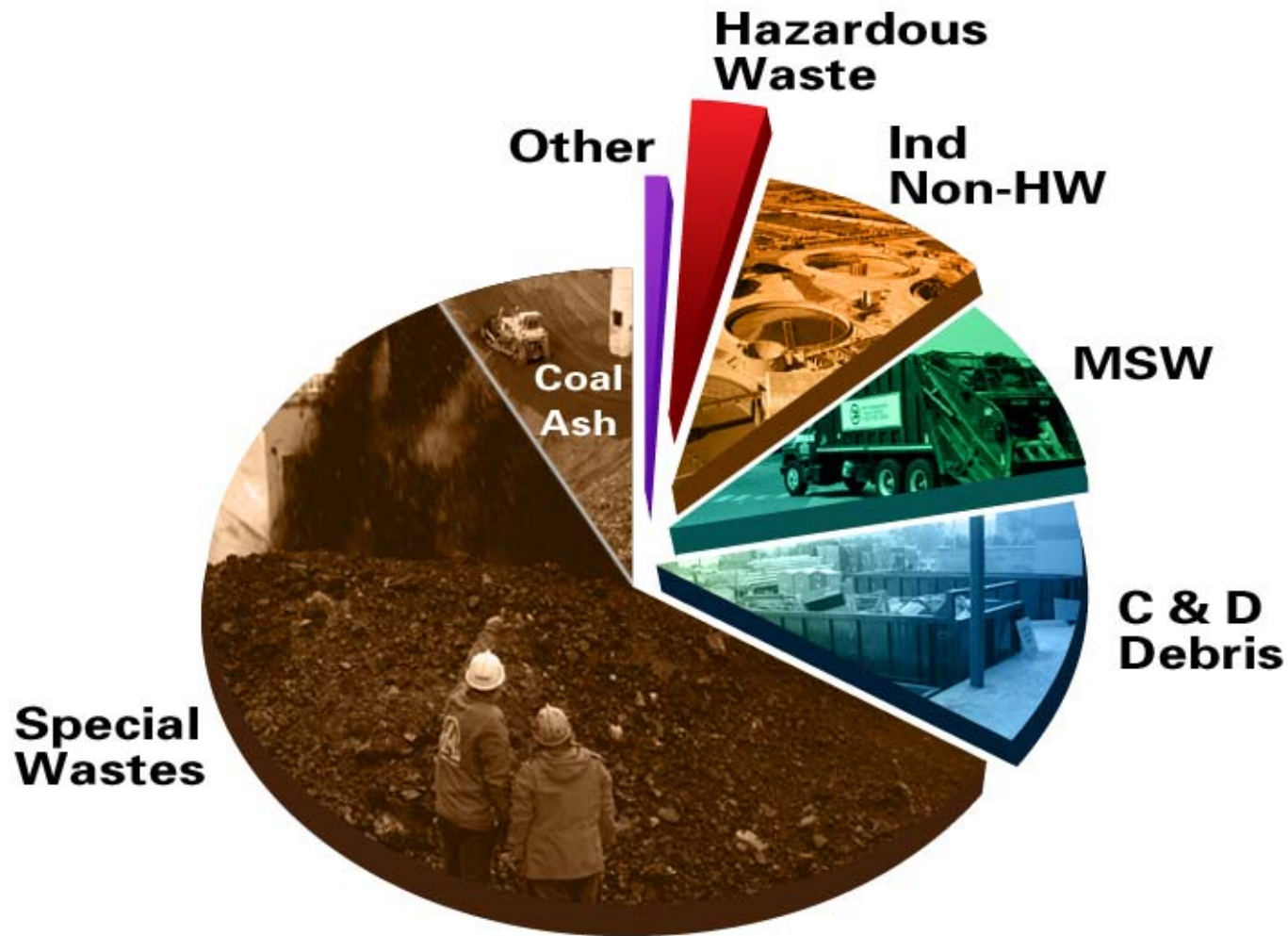
## Manufacturing



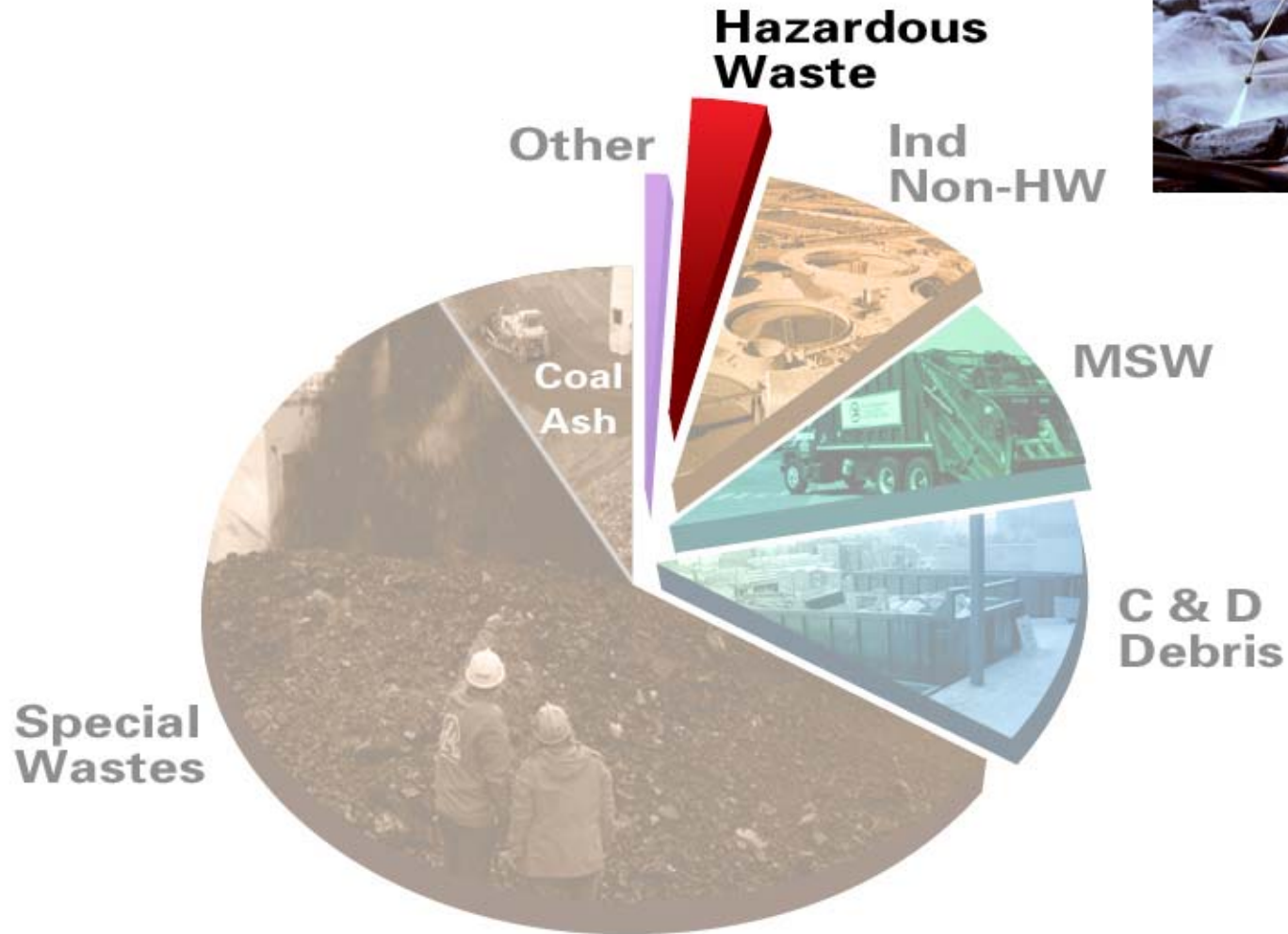
## Wastes

## (-) Releases

# The “Waste Wheel”



# Historical Focus of RCRA



# So Far, That's Been the Story


- Focused on hazardous waste
  - Built the cradle-to-grave system
  - Permits for facilities largely issued
  - Corrective action focused on high priority sites
- Next, moving to the 2020 Vision

# Unfinished Business of RCRA

## ➤ RCRA Sec. 1002(c) – Materials & Energy

- Millions of tons of recoverable material...are needlessly buried each year
- Recovery and conservation of such materials can reduce the dependence of the US on foreign resources...
- Solid waste represents a potential source of solid fuel....that can be converted into energy
- The need exists to develop alternative energy sources...
- Technology exists to produce usable energy from solid waste.

# 2020 Vision Goals

- Reduce wastes and increase the efficient sustainable use of resources.
  - Prevent exposures to humans and ecosystems from the use of hazardous chemicals.
  - Manage wastes and clean up chemical releases in a safe, environmentally sound manner.
- 
- A decorative graphic in the bottom right corner of the slide, consisting of several concentric circles in shades of blue, resembling ripples in water.

# Waste Management Hierarchy

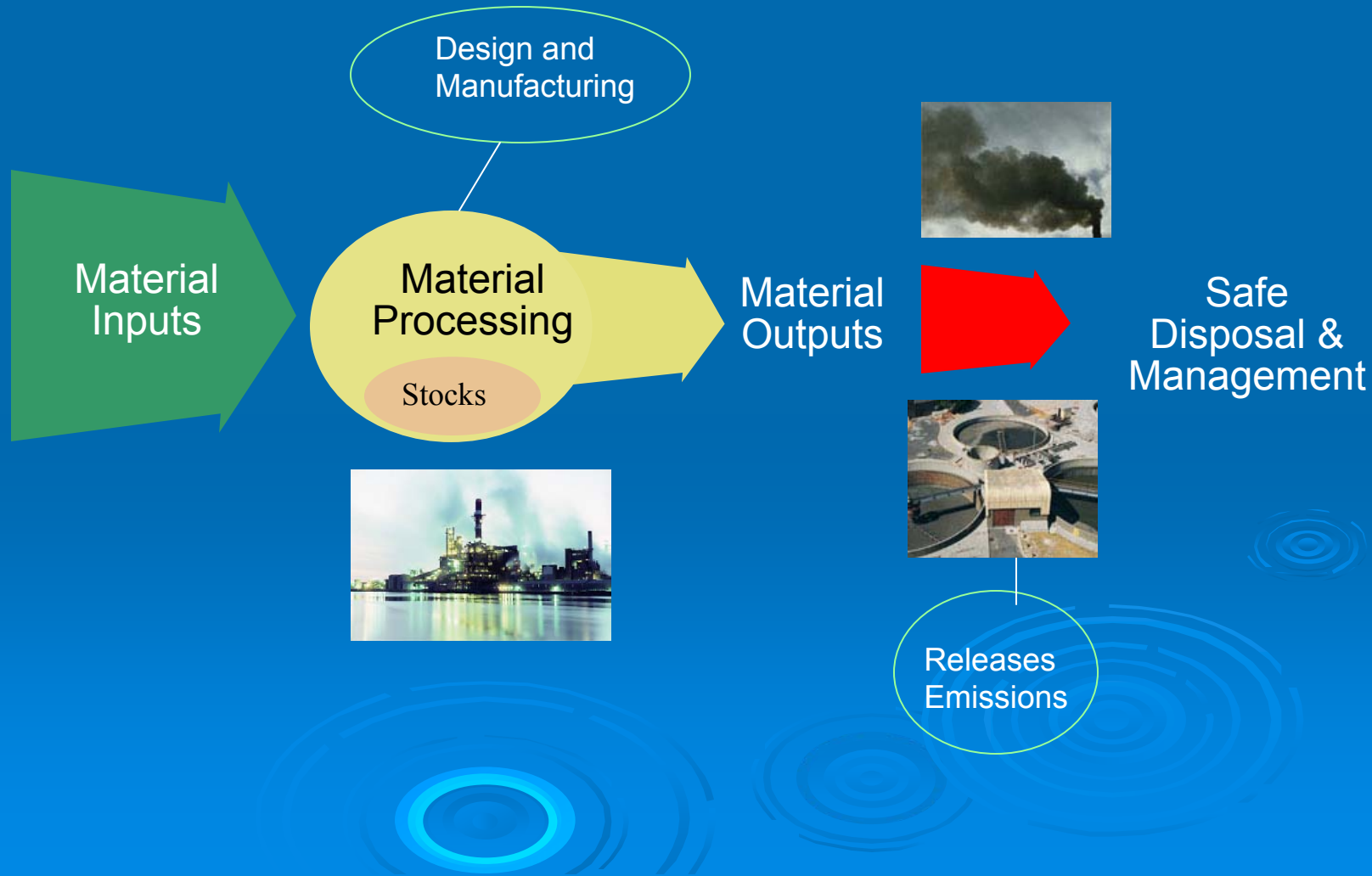
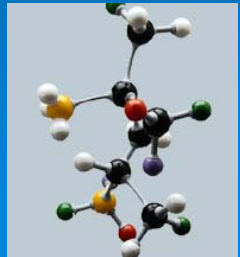
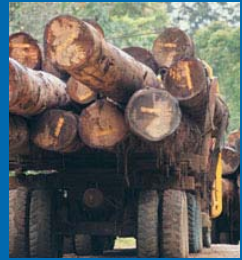
- Avoid
- Reduce
- Reuse
- Recycle
- Recover
- Treat
- Dispose

Most Desirable



Least Desirable

# Inefficient Materials Management (Cradle – to – Grave)

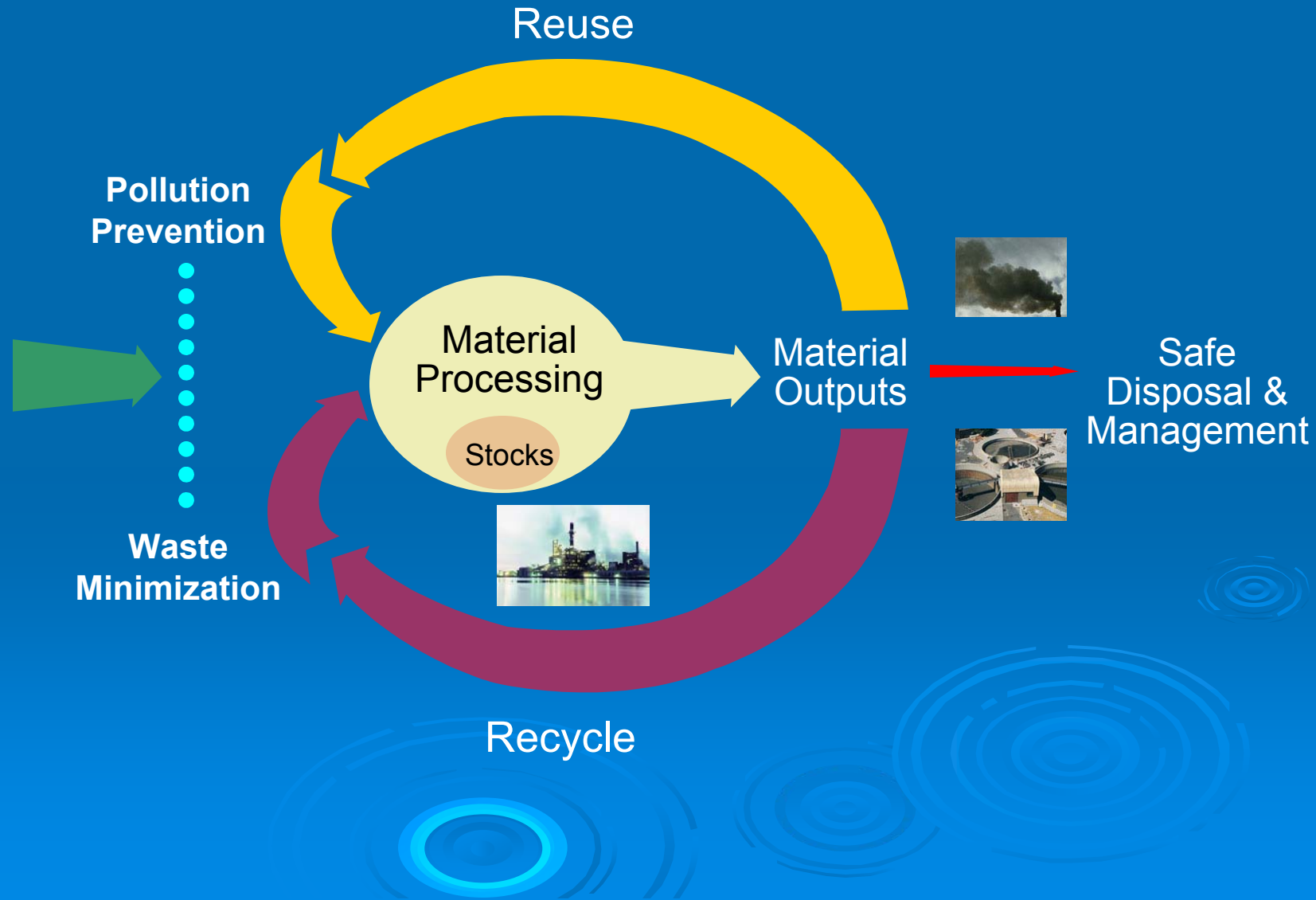


# Cradle-to-Grave

- Largely complete set of protective regulations
- Filling in gaps – responses to law suits
- Tweaking to improve certain “catch all” aspects of regulations



# Efficient Materials Management (Cradle – to – Cradle)



# Cradle to Cradle

- Early stages of development, needs priority attention
  - Criteria to ensure safe cradle to cradle management coming into focus (recognition, BMPs, guidance, EMSs, regulations)
  - As level of certainty increases, level of reuse acceptance increases
  - Attributes will inform level of criteria (tools we need to use)

# RCC Goals

- Three overarching conservation goals:
  - Prevent pollution and promote recycling and reuse of materials
  - Reduce the use of priority chemicals at all life cycle stages
  - Increase energy and materials conservation

# What the RCC Does

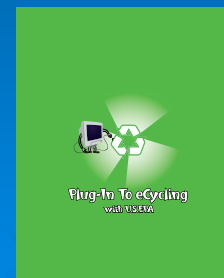
➤ RCC champions 6 program elements:

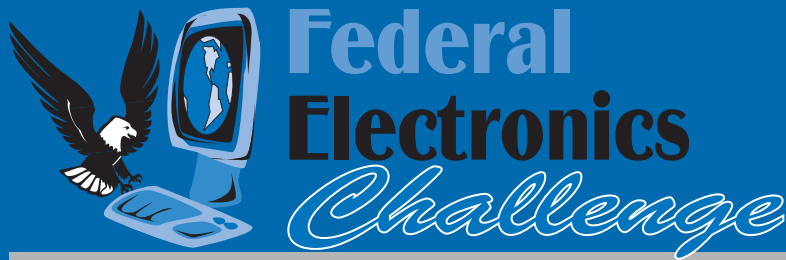
- Product stewardship
- Reducing priority chemicals
- Greening the government
- Beneficial reuse
- Energy conservation
- Environmentally friendly design

# RCC Benefits

➤ These elements, specifically the programs that support the element, provide measurable environmental benefits:

- Minimizes use of virgin resources
- Protects human health and the environment
- Saves energy
- Reduces greenhouse gases
- Creates jobs
- Grows the economy





Electronics Stewardship One Byte @ A Time

## -- Example Benefits

- Electronics Recycling results in valuable material recovery and avoided waste generation benefits
- Example: RCC E-cycling Grants allowed more than 1600 CPUs and 1800 monitors from collection events held across Colorado

### Materials Recovery due to Desktop Computer Recycling

Material	Weight in one Computer (lbs) (Ref. 3)	<u>Actual</u> Materials Recovered During Computer Collection Events in Colorado (lbs)	<u>Potential</u> Materials Recovery if National Rates of Computer Recycling were to Double (lbs)
Plastics	16.1	28,980	72,450,000
Silica	17.4	31,320	78,300,000
Lead	4.41	7,938	19,845,000
Aluminum	9.92	16,120	87,296,000
Iron	14.3	23,238	125,840,000
Zinc	1.54	2,503	13,552,000
Gold	0.00112		9,856
Silver	0.0132		116,160
Cadmium	0.00658		57,376
Mercury	0.00154		13,552



# -- Example Benefits

Description of Benefit	Quantification
<b>I. Waste</b> <ul style="list-style-type: none"> <li>- Landfill space saved</li> </ul>	350 million cubic feet
<b>II. Resource Use</b> <ul style="list-style-type: none"> <li>- Mineral resources conserved (clay, silica, gypsum, etc.)</li> </ul>	18,756 million kg
<b>III. Energy</b> <ul style="list-style-type: none"> <li>- Energy conserved due to avoided cement production</li> <li>- Avoided energy use for fly ash disposal</li> </ul>	483 million kg crude oil
<b>IV. Emissions</b> <ul style="list-style-type: none"> <li>- Greenhouse gas reductions</li> <li>- Reduction of air pollutants</li> <li>- Reduced levels of arsenic, cadmium, chromium, lead, and mercury waste in landfills</li> </ul>	11.0 million tons CO <sub>2</sub> 38 million kg nitrous oxides 5.0 million kg PM-10
<b>V. The Economy</b> <ul style="list-style-type: none"> <li>- Improved product performance— increased strength, durability, and workability</li> <li>- Market value of crude oil conserved</li> <li>- Value of mineral resources conserved</li> <li>- Value of landfill space</li> </ul>	\$141 million \$441 million

# Tire Recycling – Example Benefits

Description of benefit	Quantification
<b>I. Waste</b> <ul style="list-style-type: none"><li>- Landfill space saved</li><li>- Avoided tire piles</li></ul>	55.8 million ft <sup>3</sup>
<b>II. Resource Use</b> <ul style="list-style-type: none"><li>- Avoided petroleum use</li></ul>	Data not yet available
<b>III. Energy</b> <ul style="list-style-type: none"><li>- Energy content of petroleum conserved</li></ul>	Data not yet available
<b>IV. Emissions</b> <ul style="list-style-type: none"><li>- Avoided air emissions from tire piles</li><li>- Avoided water and oil runoff emissions from tire piles</li></ul>	296,000 kg
<b>V. The Economy</b> <ul style="list-style-type: none"><li>- Avoided clean-up costs from tire pile fires</li><li>- Economic value of landfill space saved</li><li>- Medical injury costs would decrease due to cushioning properties of rubber</li><li>- Improved product safety and suitability</li><li>- Reduced maintenance costs for road paving projects</li></ul>	\$187 million \$1.3 million \$3.56 million 80% decrease

# Tire Recycling – Example Benefits

POTENTIAL BENEFITS OF REUSING CRUSHED RUBBER FROM TIRE RECYCLING		
Benefit Category	Description	Quantification
1.) Avoided Landfilling	Diversion of scrap tires from landfills saves landfill space and prevents potential damage of landfill caps.	<ul style="list-style-type: none"><li>• 225 ft<sup>3</sup> per ton</li></ul>
2.) Avoided Tire piles	Diversion of scrap tires from tire piles avoids health problems and air emissions associated with open tire fires and mosquito breeding.	<ul style="list-style-type: none"><li>• \$3.30 per tire for clean-up after tire fires</li><li>• Health and environmental costs from tire fire emissions and mosquito-borne diseases</li></ul>
3.) Avoided Resource Use	Replacing asphalt cement, a virgin petroleum product, with recycled rubber avoids the use of petroleum.	
4.) Avoided Costs	Medical costs due to injuries would decrease due to cushioning properties of rubber	<ul style="list-style-type: none"><li>• \$660 million per year due to avoided injury costs</li></ul>



**GreenScapes**

Environmentally Beneficial Landscaping

# -- Example Benefits

Potential Reuse Applications & Impacts			
	Compost	Recycled Rubber	Plastic Lumber
<b>Types &amp; Quantities of Potential Reuse Applications</b>	<u>31.5 mil. tons of yard waste</u> for: <ul style="list-style-type: none"><li>• roadside landscaping</li></ul> <u>95.6 mil. tons of yard waste</u> for: <ul style="list-style-type: none"><li>• golf course applications</li></ul>	<u>1,990 mil. scrap tires</u> for: <ul style="list-style-type: none"><li>• playground surfacing;</li><li>• bike &amp; walking paths;</li><li>• athletic field turf; and</li><li>• running tracks</li></ul>	<u>12.1 mil. tons of HDPE, LDPE, and PET plastic</u> for: <ul style="list-style-type: none"><li>• guardrail posts, fences, retaining walls, decking, picnic tables, boardwalks, and park benches, etc...</li></ul>
<b>Estimates of Potential GHG Reductions / Climate Benefits</b>	<u>1.3 MMTCE</u> from: <ul style="list-style-type: none"><li>• avoided fertilizer &amp; water</li><li>• avoided CH<sub>4</sub> emissions from organics not disposed in landfills</li></ul>	<u>Avoided emissions</u> from prevention of tire fires: Particulates, carbon monoxide, sulfur oxides, nitrogen oxides, VOCs, dioxins, etc...	<u>6.0 MMTCE</u> due to source reduction of lumber from : <ul style="list-style-type: none"><li>• avoided landfilling; and</li><li>• avoided incineration of plastic and wood.</li></ul>

# RCC Strategic Plans

- RCC is in the process of working with stakeholders to develop 3-5 year strategic plans.
- New targets and measures will be incorporated into the Agency's overall 2005-2008 Strategic Plan.
- The plans will be available this fall.



# A Guide to RCC Partnerships

- Many different types of partnerships that can be developed – informal to formal
- Five Steps to Becoming a RCC Partner
  - Identify environmental problem and define challenge
  - Identify and dialogue with partners
  - Identify and develop solutions, objectives, targets, implementation plan & time line
  - Announce partnership & agreement
  - Publicize reaching major milestones

# RCC Resources

- Some resources are available through:
  - Regional and State grants
  - Innovation Workgroup grants
  - Headquarters' funding, e.g., schools
- EPA Regions are the contacts; not an open competition process
- Allow work to take place on a project level to test ideas

# Current 2004 Clusters

- Industrial Waste
- Schools
- Electronics
- Targeted Chemical Reduction
- Paper
- Green Buildings
- Tires
- Organics
- Industrial Design
- Hospitals
- C & D Debris

## Annual Report 2002 - 2003

[illegible] Printed with Vegetable Oil Based Ink on 100% PostConsumer-Waste Recycled Paper

[www.epa.gov/rcc](http://www.epa.gov/rcc)

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